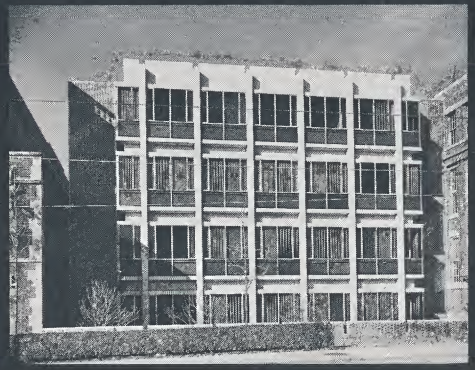

# THE MOORE SCHOOL OF ELECTRICAL ENGINEERING
## UNIVERSITY of PENNSYLVANIA

# 1965

## SPECIAL SUMMER SESSION

**JUNE 14 - JUNE 25, 1965**

**CONTINUING EDUCATION ON ADVANCED DEVELOPMENTS IN ELECTRICAL ENGINEERING**

**I. ADVANCED DIGITAL COMPUTER PROGRAMMING**

**II. ELECTROMAGNETIC COMPATIBILITY**

**III. AUTOMATIC CHECKOUT TECHNIQUES**

# 1965 SPECIAL SUMMER SESSION
# THE MOORE SCHOOL OF ELECTRICAL ENGINEERING
# UNIVERSITY of PENNSYLVANIA
# JUNE 14-25, 1965

## CONTINUING EDUCATION ON ADVANCED DEVELOPMENTS IN ELECTRICAL ENGINEERING

### I. ADVANCED DIGITAL COMPUTER PROGRAMMING

*June 14 to June 25; 60 lectures, 1 hour each.*

This Program will stress both theory and practice of problem-solving using digital computers and remote consoles.

From the overall point of view, the Program will emphasize the philosophy of a "growing machine." By this is meant the need for a developing language-processor system, composed of both equipment and programs, combined with a growing memory structure in which information of all sorts is stored in a universally-accessible form. Lectures will include a discussion of methods of coding and reorganizing both data and programs in the form of trees, graphs, prefix-languages, and other structures. The theory relating automata, finite-state languages and push down languages will be discussed including the development of recognizers for these and more extensive systems and the representation of the semantics of algorithms.

A sequence of lectures will describe the detailed structures of the important systems which have a major effect on the future of programming, such as ALGOL, LISP, NPL, MULTILIST (a large-scale key file system). The discussion of memory systems will include methods of filing, calling, and organizing large-scale memories for work in problem-solving systems as well as discussions of the state of programming for information retrieval. The techniques of assembly, storage, allocation, and processor expansion will be continuously stressed in the light of the coming generalization of processor structures.

A series of lectures on the Project MAC real-time system and its internal structure, as well as on The Moore School of Electrical Engineering MULTILIST remote system, will emphasize the coming marked change in philosophy and practice in which the use of digital computers may become more like that of a public utility.

Arrangements have been made for participants to use the IPL-V, LISP, MULTILIST, and ALGOL systems now available at the University of Pennsylvania, including the feature of dynamic storage, recursive usage of subroutines, and the mixture of algebraic and assembly language. Students desiring to do so will be furnished ahead of time with material describing the external structure of these processors, and should indicate their specific processor interest.

Lecturers:
JOHN W. CARR, III, The Moore School of Electrical Engineering
PAUL ABRAHAMS, Information International
SAUL GORN, The Moore School of Electrical Engineering
ROBERT GRAHAM, Massachusetts Institute of Technology
ROBERT MCNAUGHTON, Massachusetts Institute of Technology
ALAN J. PERLIS, Carnegie Institute of Technology
NOAH PRYWES, The Moore School of Electrical Engineering
MORRIS RUBINOFF, The Moore School of Electrical Engineering

### II. ELECTROMAGNETIC COMPATIBILITY

*June 14 to June 25; 40 lectures, 1½ hours each.*

Electromagnetic compatibility is recognized as critical in almost all large electronic systems. Its basic resolution lies in the adoption of an adequate systems point of view, an understanding of the basic scientific principles involved, and recognition of the differences between intra-system and inter-system compatibility problems.

This program is designed to benefit those who have responsibilities in the areas of management, systems engineering, design engineering, and operations. It will provide extensive treatment of fundamental scientific principles and their applications in compatibility problems. Selected applications of these principles will illustrate statistical methods and the role of computers in interference analysis. Discussion of economic considerations will include the consequences of inadequate accounting of electromagnetic compatibility requirements at the inception of systems engineering versus the use of quick-fix and retrofitting methods.

The topics to be covered are:

1. *Systems Considerations and Models.*
2. *Applications of Statistics in Prediction.*
3. *Characteristics of Emitters, Receivers, Antennas, Transmission Lines and Propagation Effects.*
4. *Susceptibility Criteria.*
5. *Measurement Techniques and Interference Suppression including Frequency Assignment, Shielding, Filters, Blankers, Signal Shaping.*

Lecturers:
O. M. SALATI, The Moore School of Electrical Engineering
J. EGLI, United States Army Electronics Command
F. HABER, The Moore School of Electrical Engineering
W. E. PAKALA, Westinghouse Electric Corporation
W. Y. PAN, Radio Corporation of America
L. PETERS, Ohio State University
R. MAYHER, Electromagnetic Compatibility Analysis Center
J. ROMAN, U. S. Navy Bureau of Ships
R. SCHULZ, The Boeing Company
R. F. SCHWARTZ, The Moore School of Electrical Engineering
R. M. SHOWERS, The Moore School of Electrical Engineering
S. ZACHARY, Rome Air Development Center

### III. AUTOMATIC CHECKOUT TECHNIQUES

*June 14 to June 25; 30 lectures, 2 hours each.*

Automatic testing techniques are entering a period of rapid development and are gaining greater importance in the successful design and operation of complex industrial and military systems. The purpose of this Program is to provide an intensive introduction to the theories and techniques essential to the design of automatic test equipment. While the emphasis is on electronic system maintenance, attention is paid to non-electronic systems as well. Circuit analysis techniques, statistical methods, and checkout programming languages will be covered in depth, progressing from basic fundamentals through the latest advanced practical techniques. Other topics establish a related spectrum of the useful concepts, methodologies, and tools that form the basis for realistic design of automatic test equipments of the future. Lecturers will draw upon their own first-hand experience to describe specific examples of the various specialties involved. Topics include:

1. *Review of State of the Art.*
2. *Automatic Fault Isolation and Solvability Theory.*
3. *Automatic Circuit Analysis.*
4. *Methods of Probability and Statistics.*
5. *Checkout Programming Languages and Compilers.*
6. *Measurement Techniques.*
7. *Non-Electronic Systems.*
8. *Self-Adaptive Checkout Techniques.*
9. *Physics of Failure.*
10. *Failure Prediction.*
11. *Systems Engineering and Economic Tradeoffs.*

Lecturers:
R. S. BERKOWITZ, The Moore School of Electrical Engineering
F. M. BARSAM, Burroughs Corporation
F. BECK, Radio Corporation of America
C. BECKMAN, University of Pennsylvania
S. D. BEDROSIAN, University of Pennsylvania
R. BRACHMAN, Frankford Arsenal
T. C. CHEN, University of Pennsylvania
B. W. CLARK, International Business Machines Corporation
L. J. COHEN, Leo J. Cohen & Associates
E. FASKO, General Electric Company
J. B. GIBBONS, General Electric Company
D. M. GOODMAN, New York University
H. C. GORTON, Battelle Memorial Institute
C. W. HAMILTON, Battelle Memorial Institute
T. J. B. HANNOM, Sperry Rand Corporation, UNIVAC Division
E. KARLIN, Radio Corporation of America
G. KASKEY, Sperry Rand Corporation, UNIVAC Division
W. O'LEARY, Radio Corporation of America
D. PRENER, Leo J. Cohen & Associates
R. F. SCHWARTZ, The Moore School of Electrical Engineering
D. B. SMITH, The Moore School of Electrical Engineering
B. H. WENT, JR., Battelle Memorial Institute

## INFORMATION REGARDING CLASSES

Class instruction will be intensive. Participants will generally attend class 6 hours per day, 5 days per week, 60 hours in all. Notes will be provided at the beginning of each Program. During each class period, time will be allotted for questions on both the lectures and the notes. Teaching will be authoritative; the staff has been assembled from the faculties of the Moore School and other leading academic institutions and from the forward ranks of industry.

## REGISTRATION

Advance registration is required in all Programs and should reach the Special Summer Sessions Office two weeks in advance of the Program. An application form for the purpose is enclosed with this announcement. Enrollment fee is $250 per Program; an institutional rate of $125 is available to staff members of colleges and universities on request. Checks should be made payable to THE TRUSTEES OF THE UNIVERSITY OF PENNSYLVANIA.

Enrollment is necessarily limited and applications will be accepted in order of receipt. Applications and general inquiries should be directed to The Moore School of Electrical Engineering, Special Summer Sessions Office, University of Pennsylvania, Philadelphia, Pennsylvania 19104.

## PREREQUISITE

Prerequisite for enrollment in any Program is a bachelor's degree or equivalent in engineering, mathematics, or science. The Moore School reserves the right, because of limited enrollment, to select those applicants who would apparently obtain maximum benefits from the Program.

## PARKING

Arrangements have been made for use of a parking garage in close proximity to the lecture building. It will be necessary for those desiring to use this facility to purchase a two week parking ticket. Fee: $10.00.

## HOUSING

Air-conditioned housing will be available for both male and female students at the Sheraton Motor Inn, 39th and Chestnut Streets at the rate of $7.00 per night for a single room and $10.00 per night for a double room. The number of single rooms is limited and will be assigned in order of receipt of applications. Reservations should be made by checking the appropriate square on the application form. Rooms are also available in the University Residences for slightly reduced rates; these rooms are not air-conditioned.

Meals may be purchased at Houston Hall, Monday through Friday. Good restaurants are available in the campus area and in center city. The campus is only a ten-minute bus or subway ride from center city.

## WEEKEND RECREATIONAL FACILITIES

Philadelphia offers a wide variety of recreational facilities during the spring and summer. The Special Summer Sessions will have available copies of publications of the convention bureau which list various activities such as summer theaters, concerts, and the Philadelphia Phillies baseball games. The tennis courts and swimming pool of the University will also be available to students.

IMPORTANT NOTICE: Please excuse multiple receipt of official announcements. Because our mailing lists come from many sources, we cannot check them all for duplications. We would appreciate your transmitting your extra copy to a colleague.

UNIVERSITY OF PENNSYLVANIA
PRINTING OFFICE

# *UNIVERSITY of PENNSYLVANIA*

**The Moore School of Electrical Engineering**

## APPLICATION FOR 1965 SPECIAL SUMMER SESSION

**1. Name of Program**

☐ Advanced Digital Computer Programming ..... June 14 to June 25 inclusive

☐ Electro-Magnetic Compatibility ..... June 14 to June 25 inclusive

☐ Automatic Checkout Techniques ..... June 14 to June 25 inclusive

**2. Name of Applicant** ..... **Male** ☐ **Female** ☐
Last Name First Name Initial

**3. Home Address** .....
Number and Street City State Zip Code

**4. Business Address** .....
Name of Company or Institution

.....
Number and Street City State Zip Code

**5. College(s) Attended** **Major Field** **Degree(s)** **Date(s) Rec'd**

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**6. Room Reservation** if air conditioned accommodation is desired at the Sheraton Motor Inn, 39th and Chestnut Sts.

☐ Single Room—$7.00 per night ☐ Double Room—$10.00 per night

Rooms are also available in the University Residences for slightly reduced rates.

**7. Parking Space**

☐ $10.00 per program Motor vehicle license number .....

**8. Financial Arrangements:** Enrollment in the Special Summer Session requires advance payment of fees or advance arrangement for payment. Indicate which type of arrangement you are making.

☐ A check for fees is enclosed with this application.
(Checks should be made payable to **The Trustees of the University of Pennsylvania** and have attached the name of the applicant or applicants. Advance payment will be refunded if withdrawal is necessary.)

☐ A government training contract or purchase order is being prepared by the following government agency.

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☐ A company purchase order or a letter authorizing billing by the University of Pennsylvania is enclosed or is being sent to the Special Summer Session Office.

*Please return the completed application to:*

**Special Summer Session Office**
**The Moore School of Electrical Engineering**
**University of Pennsylvania**
**Philadelphia, Pennsylvania 19104**